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INCINERATOR CHIMNEY EXTENSION

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Fig 1

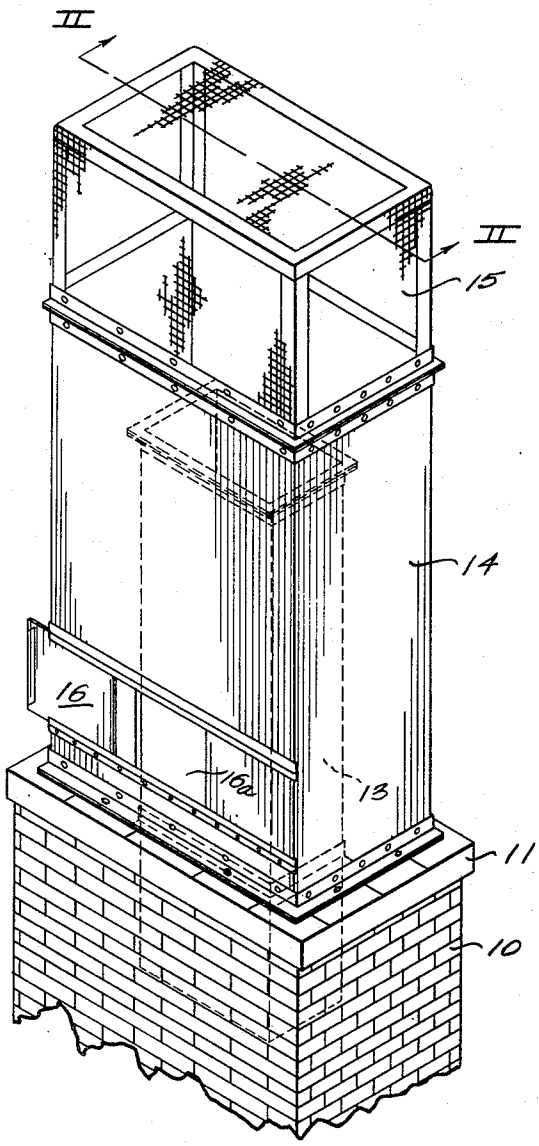
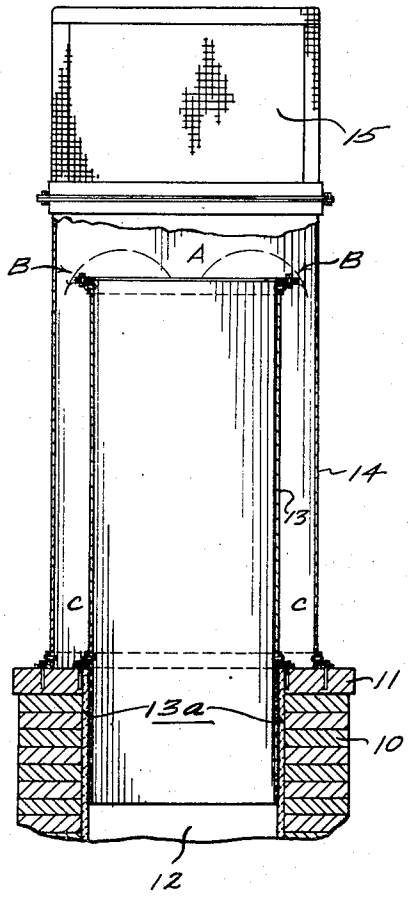


Fig 2



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INCINERATOR CHIMNEY EXTENSION

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The present invention relates to a chimney extension and particularly to an extension for the chimney or stack of an incinerator which minimizes the heretofore objectionable discharge of fly ash therefrom during certain conditions of operation.

When an incinerator is fed with quantities of loose paper or similar readily combustible material, the rapid burning thereof creates a strong draft which causes large quantities of fly ash to be discharged from the chimney or stack. This undesirable result also follows from increase in the draft of a moderate fire when strong winds blow across the discharge end of the chimney. Even though screens are provided the persistence of a strong draft at the discharge end causes a breaking up or pulverization of fly ash lodged against the inside of the screen and a subsequent objectionable discharge of the pulverized ash into the surrounding atmosphere. The objectionable results of the settling of such discharged fly ash in the area adjacent the incinerator are obvious and well known.

The structure of the present invention eliminates or greatly minimizes those objections by arranging for discharge of gases from the chimney flue into a large volume chamber surrounding and extending above the discharge end of the stack and closed at its lower end at a substantial distance below such discharge end. Such expansion into a larger chamber effects a decrease in velocity and pressure of the gases and most of the fly ash carried thereby drops to the bottom of the chamber. While some of the fly ash may be initially carried to the inner side of the screen, the velocity of the gases at such point is diminished to such an extent that the ash so deposited will not be pulverized and driven out through the screen but will drop into the surrounding chamber upon a temporary diminution of the excess draft.

Furthermore, high winds blowing across the discharge end of the stack or chimney which would ordinarily increase the draft and objectionable discharge of fly ash merely cause a turbulence at the junction of the discharge end of the chimney flue and the larger surrounding chamber thus neutralizing the tendency toward an increased draft.

It is an important object, therefore, of the present invention to provide a chimney structure wherein the discharge of fly ash due to increased drafts is prevented or greatly minimized.

It is a further important object of this invention to accomplish these desired results by a simple and inexpensive structure which is sightly in appearance and which may readily be applied to existing incinerator and similar chimneys.

Other and further important objects of this invention will be apparent from the following specification and the accompanying drawings.

The invention (in a preferred form) is shown on the drawings and hereinafter more fully described.

On the drawings:

Fig. 1 is a perspective view showing the upper end of an incinerator chimney with an embodiment of the present invention operatively associated therewith; and

Fig. 2 is a longitudinal vertical section taken along the lines II—II of Fig. 1.

As shown on the drawings:

Reference numeral **10** designates a standard brick chimney or stack of the kind ordinarily used with incinerators and the like. Such a chimney ordinarily is provided with a row of bricks **11** forming a terminal

flange at the discharge end of the chimney which may project slightly beyond the surface of the body of the chimney **10**. The interior of the chimney is provided with a usual flue **12** the outer surfaces of which are ordinarily defined by the inner faces of the bricks from which the chimney is built.

In accordance with the present invention, we provide an extension flue **13** which extends substantially above the usual discharge end of the chimney and which is adapted to provide a passage for the outward travel of gases from the flue **12**. In the present invention, this flue extension **13** is preferably made of metal and so dimensioned as to fit tightly inside the flue **12**, said flue extension **13** ordinarily being secured in position inside the flue **12** by cement as shown at **13***a*.

Resting on the flange bricks **11** and secured thereto in definite spaced relationship with the flue extension **13** is a casing **14** which is symmetrical in reference to the flue extension **13** to the extent that it is laterally spaced therefrom in equal distance on all sides thereof. The casing **14** extends a substantial distance above the discharge end of the flue extension **13** and the upper end of the casing **14** which is open is covered by a screen **15** secured thereto in any suitable manner. The casing **14** and the screen **15** are preferably made of metal or other incombustible material.

As an example of relative dimension, it may be noted that satisfactory results have been obtained by the use of a flue extension **13** extending from forty-eight inches to fifty inches above the upper surface of the chimney flange bricks **11** to an outer casing **14** having its discharge end into the screen **15** from ten inches to twelve inches above the discharge end of the flue extension **13**, a uniform space of approximately six inches being provided between the inner walls of the chamber **14** and the outer walls of the flue extension **13**.

It should be noted that while we have shown a square or rectangular flue and chimney construction, the advantages of this invention also may be attained in a structure wherein the flue extension **13** and the surrounding casing **14** are circular or oval in cross-section, or indeed of any desired cross-section so long as the flue extension and the outer casing are of such relative shape that a space therebetween is of substantially constant cross-sectional area.

In operation of the apparatus of this invention, gases flowing through the flue **12** and out through the flue extension **13** will be discharged into a chamber A of substantially larger area whereupon the velocity and pressure thereof are substantially decreased. This expansion of the gases into a larger area will cause a substantial reduction in pressure, particularly in the region B surrounding the discharge end of the flue extension **13** and this reduction in pressure will permit fly ash carried by the flue gases to drop into the chamber C formed between the outer walls of the flue extension **13** and the inner walls of the casing **14**. Even though a certain amount of fly ash may be carried up against the inner side of the screen **15**, the pressure and velocity of gases emanating from the flue extension **13** has been so much decreased that this fly ash will not be pulverized and upon any diminution of the draft will drop back into the chamber C.

Furthermore, when there is a cross wind blowing across the open end of the chamber **14**, that will tend to cause a turbulence of air within the chamber above the discharge end of the flue extension **13**, thus neutralizing any tendency of an increased draft which ordinarily results from such a cross wind.

It is to be noted that the lower end of the chamber formed between the flue extension **13** and the casing **14** is normally kept closed so as to form a dead air chamber into which the fly ash may readily drop. Access

to the interior of this chamber is conveniently provided by a sliding door or plate 16 which uncovers an opening 16*a* in one of the walls of the casing 14 near the bottom thereof and thus permits the taking out of fly ash and other material deposited within the chamber C.

It will be apparent from the foregoing that by this invention we have provided a simple and inexpensive apparatus which readily may be applied to existing incinerator chimneys when built as a part of newly constructed chimneys and which prevents or minimizes the discharge of fly ash into the atmosphere surrounding such chimneys.

It will be further apparent that the expansion of the stack gases into the regions B and the consequent drop of pressure at those regions will result in soot or other material being separated from the gases and dropping into the chamber C.

We are aware that details of construction may be varied without departing from the principles of this invention and we, therefore, do not propose limiting the patent granted hereon otherwise than necessitated by the scope of the appended claims.

We claim as our invention:

1. In a chimney, an upright support structure of rectangular configuration having an interior flue of rectangular cross-section, a flue extension of rectangular cross-section having a lower portion fitting tightly inside said flue and an upper portion extending upwardly above the upper end of said support structure and terminating in an open upper end, a casing of rectangular cross-section surrounding the upper portion of said flue extension and secured at its lower end to the upper end of said support structure, said casing terminating in an open end substantially above the open upper end of said flue extension to define an expansion chamber immediately above the open upper end of said flue extension, said expansion chamber being of substantially greater unobstructed cross-section than the cross-section of said flue extension and providing an unobstructed path for gases and matter carried therewith straight upwardly from said flue extension and providing an unobstructed path for lateral expansion of the gases and matter carried therewith as the gases leave said flue extension to provide a substantial reduction in the velocity of the gases traveling upwardly through the expansion chamber, said flue extension upper portion, said casing and said support structure upper end defining a dead air chamber below said expansion chamber and in direct unobstructed communication therewith to receive matter falling from the expansion chamber, and a screen extending across the entire cross-section of the open upper end of said casing above said expansion chamber, the screen providing a path for flow of gases upwardly from said expansion chamber and through said screen of cross-section substantially larger than the cross-section of said flue extension, and the flue extension providing an unobstructed path for gases and matter carried therewith straight upwardly over the entire cross-section thereof from said flue to said expansion chamber.

2. In a chimney, an upright structure, a flue extension extending upwardly above the upper end of said support structure and terminating in an open upper end, a casing surrounding the flue extension and substantially spaced therefrom and terminating in an open upper end substantially above the open upper end of said flue extension to define an expansion chamber immediately above the open upper end of said flue extension, said expansion chamber being of substantially greater unobstructed cross-section than the cross-section of said flue extension and providing an unobstructed path for gases and matter carried therewith straight upwardly from said flue extension and providing an unobstructed path for lateral expansion of the gases and matter carried therewith as the same travel upwardly through said expansion chamber to provide a substantial reduction in the velocity of the gases in the expansion chamber, means including said flue extension and said casing defining a dead air chamber below said expansion chamber and in direct unobstructed communication therewith for receiving the matter falling from the expansion chamber, and a screen extending across the entire cross-section of the open upper end of said casing above said expansion chamber, the screen providing a path for flow of gases upwardly from said expansion chamber and through said screen of cross-section substantially greater than the cross-section of said flue extension, and said flue extension providing an unobstructed path for gases and matter carried therewith straight upwardly over the entire cross-section and length thereof.

3. In combination, a flue member having an open upper end, a casing surrounding said flue member and substantially spaced therefrom, said casing terminating in an open upper end substantially above the open upper end of said flue member to define an expansion chamber immediately above the open upper end of said flue member, said expansion chamber being of substantially greater unobstructed cross-section than the cross-section of said flue member and providing an unobstructed path for gases and matter carried therewith straight upwardly from said flue member and providing an unobstructed path for lateral expansion of the gases and matter carried therewith as the gases travel upwardly through the expansion chamber to provide a substantial reduction in the velocity of the gases in the expansion chamber, means comprising said flue member and said casing defining a dead air chamber below said expansion chamber and in direct unobstructed communication therewith, and a screen extending across the entire cross-section of the open upper end of said casing above said expansion chamber, the screen providing a path for flow of gases upwardly from said expansion chamber and through said screen of cross-section substantially larger than the cross-section of the flue member, and the flue member providing an unobstructed path for gases and matter carried therewith straight upwardly over the entire length and cross-section of the flue member.

4. In combination, a flue member having an open upper end, a casing surrounding the flue member in spaced relation and terminating in an open upper end substantially above the open upper end of said flue member to define an expansion chamber immediately above the open end of said flue member, said expansion chamber being of substantially greater unobstructed cross-section than the cross-section of said flue member and providing an unobstructed path for gases and matter carried therewith straight upwardly from said flue member and providing an unobstructed path laterally from the open upper end of said flue member for gases and matter carried therewith to accommodate lateral expansion of the gases and a substantial reduction in the velocity thereof as the gases travel upwardly through the expansion chamber, means comprising said flue member and said casing defining a dead air chamber below said expansion chamber and in direct substantially unobstructed communication therewith, said flue member providing a substantially unobstructed path for gases and matter carried therewith straight upwardly over the entire cross-section thereof and over the entire extent thereof.

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